FLIES AND THEIR DISEASES

MEDICAL ACADEMY NAMED BY SI GEORGIEVISKIY CFU NAMED BY V.I.VERANDSKIY

DEPARTMENT OF MEDICAL BIOLOGY

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Examples of Diptera (Flies)

Early Stage Decomposition

Life Cycle of a Calliphoridae Fly

Blow & Greenbottle Flies (Calliphoridae)
Metallic thorax and abdomen

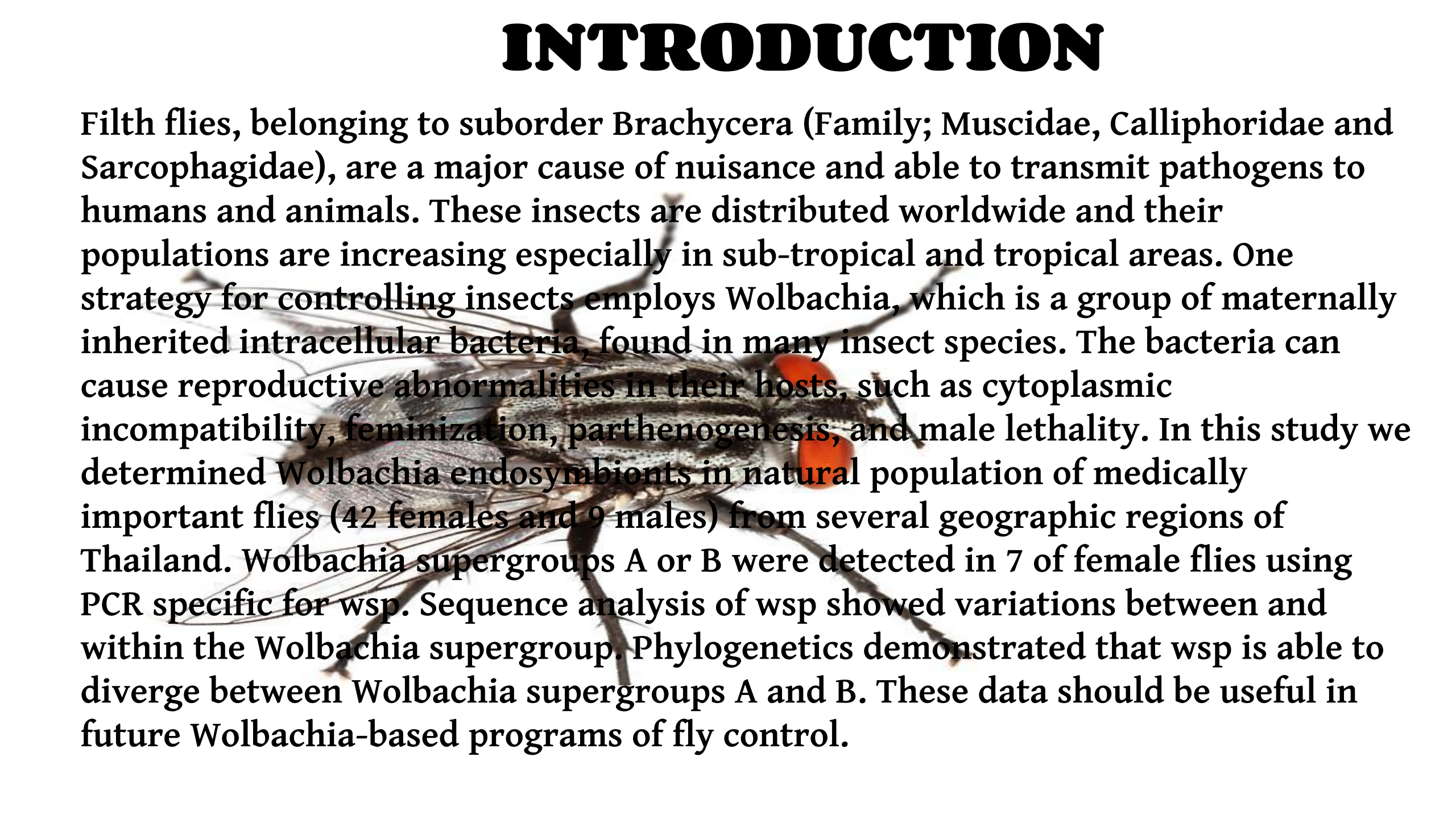
Flesh Fly (Sarcophagidae)
Striped thorax

Late Stage Decomposition

House Fly (Muscidae)

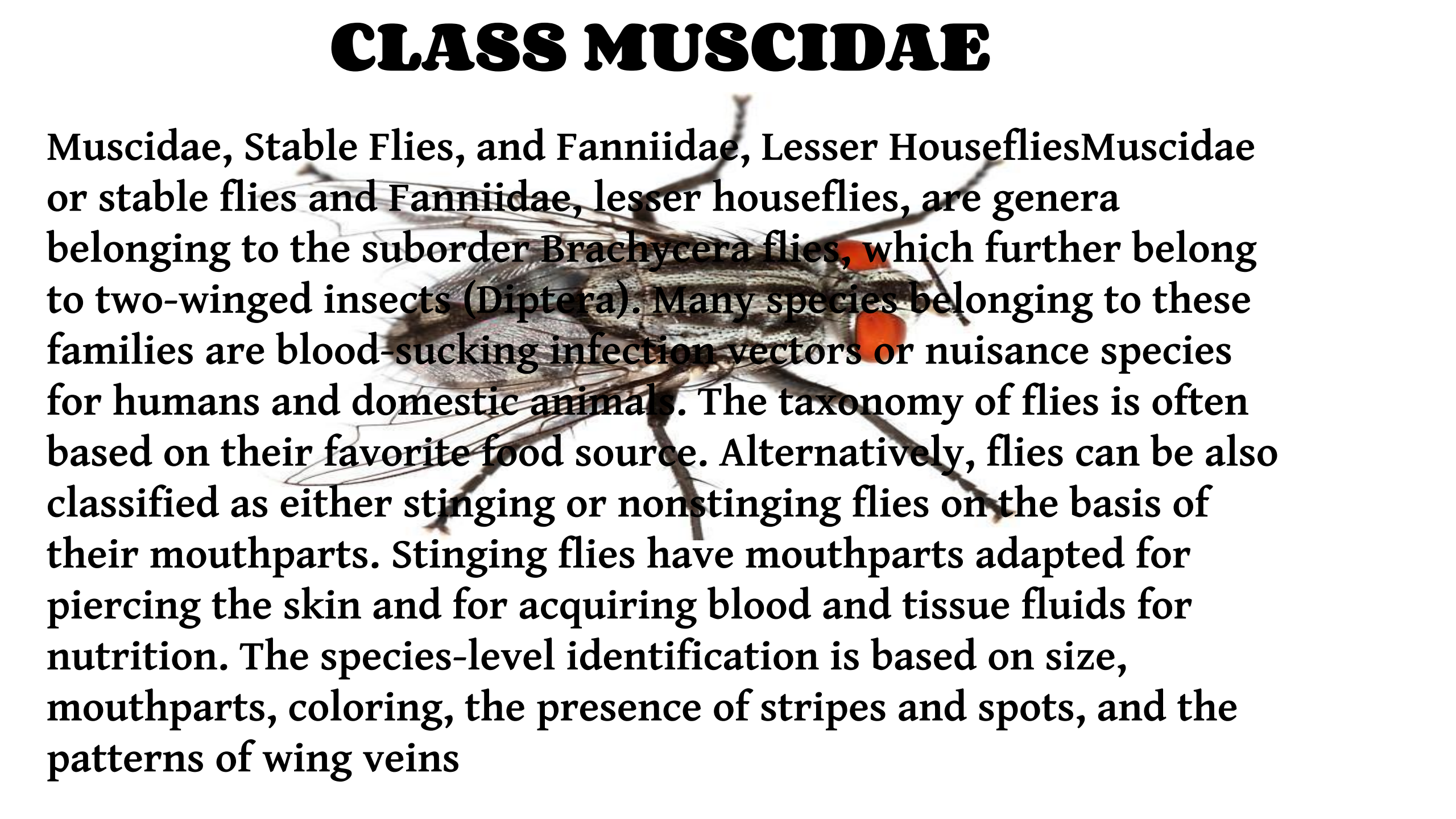
Cheese Skipper (Piophilidae)

INTRODUCTION



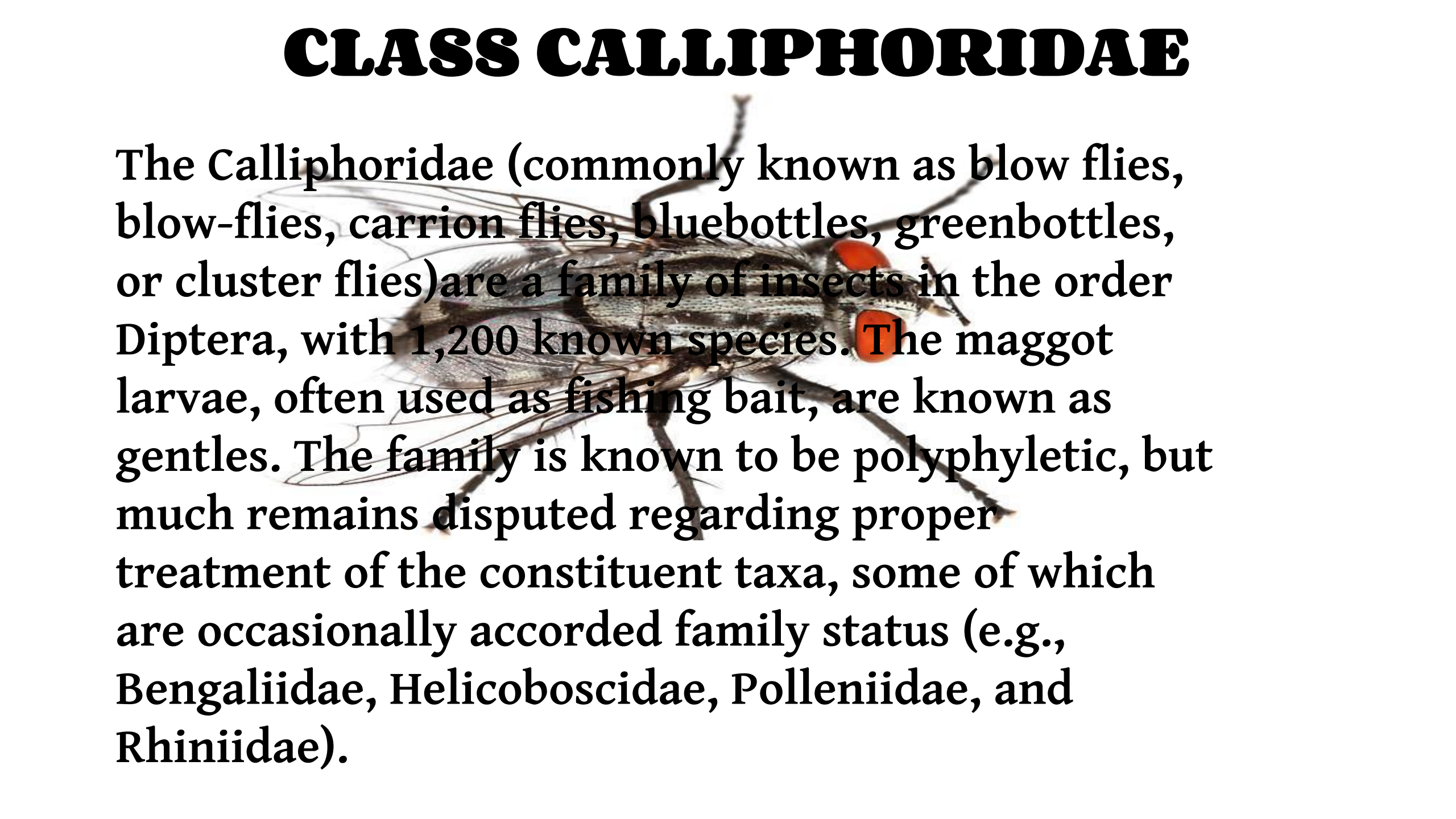
Filth flies, belonging to suborder Brachycera (Family; Muscidae, Calliphoridae and Sarcophagidae), are a major cause of nuisance and able to transmit pathogens to humans and animals. These insects are distributed worldwide and their populations are increasing especially in sub-tropical and tropical areas. One strategy for controlling insects employs Wolbachia, which is a group of maternally inherited intracellular bacteria, found in many insect species. The bacteria can cause reproductive abnormalities in their hosts, such as cytoplasmic incompatibility, feminization, parthenogenesis, and male lethality. In this study we determined Wolbachia endosymbionts in natural population of medically important flies (42 females and 9 males) from several geographic regions of Thailand. Wolbachia supergroups A or B were detected in 7 of female flies using PCR specific for wsp. Sequence analysis of wsp showed variations between and within the Wolbachia supergroup. Phylogenetics demonstrated that wsp is able to diverge between Wolbachia supergroups A and B. These data should be useful in future Wolbachia-based programs of fly control.

CLASS MUSCIDAE



Muscidae, Stable Flies, and Fanniidae, Lesser HouseflіesMuscidae or stable flies and Fanniidae, lesser houseflies, are genera belonging to the suborder Brachycera flies, which further belong to two-winged insects (Diptera). Many species belonging to these families are blood-sucking infection vectors or nuisance species for humans and domestic animals. The taxonomy of flies is often based on their favorite food source. Alternatively, flies can be also classified as either stinging or nonstinging flies on the basis of their mouthparts. Stinging flies have mouthparts adapted for piercing the skin and for acquiring blood and tissue fluids for nutrition. The species-level identification is based on size, mouthparts, coloring, the presence of stripes and spots, and the patterns of wing veins

CLASS CALLIPHORIDAE



The Calliphoridae (commonly known as blow flies, blow-flies, carrion flies, bluebottles, greenbottles, or cluster flies)are a family of insects in the order Diptera, with 1,200 known species. The maggot larvae, often used as fishing bait, are known as gentles. The family is known to be polyphyletic, but much remains disputed regarding proper treatment of the constituent taxa, some of which are occasionally accorded family status (e.g., Bengaliidae, Helicoboscidae, Polleniidae, and Rhiniidae).

Sarcophagidae

- Commonly known as flesh flies
- Larviparous:
  - The eggs develop internally and the females birth live larvae that is relatively large in size
- *Sarcophaga bullata* were specifically used to represent the single species
- Representative of a lab setting testing a single species of fly

Sarcophaga bullata

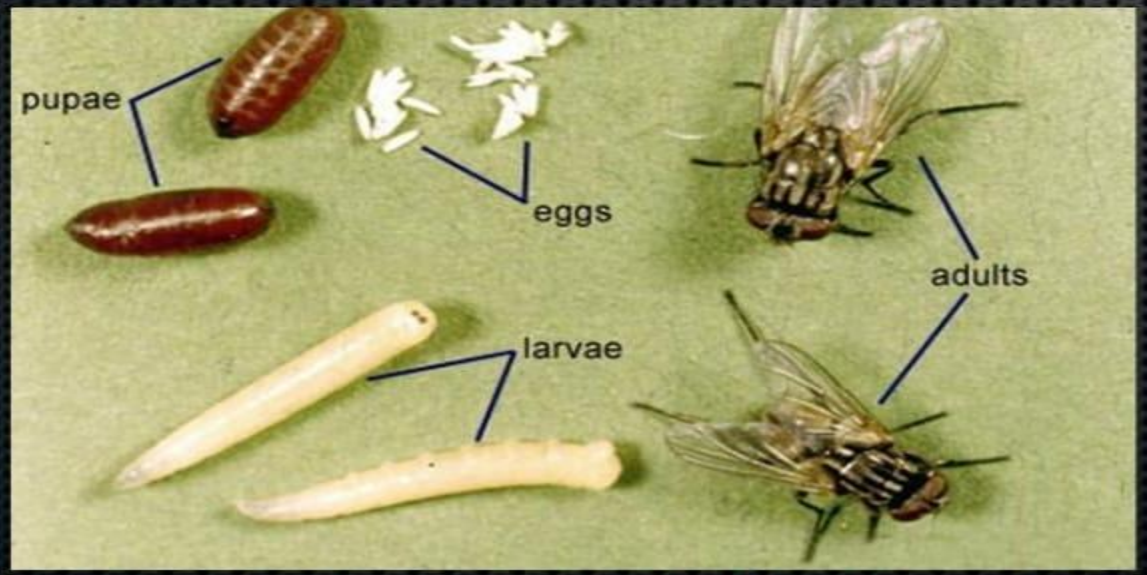
Blowfly (Family Calliphoridae)

Blowfly (Family Calliphoridae)

a. Description and lifespan: The blow fly feeds on decaying matter and feces. The blowfly infests in wounds or matted hair of sheep, goats, cattle, and others. The lifespan of a blowfly is between 2-8 weeks
b. Symptoms: Inflamed wounds, hair loss. Blood poisoning may occur.
c. Treatment: Removing dirty wool, cleaning up and dressing any open wounds.
d. Prevention: Cleanup any animal remains, feces, and garbage to reduce attraction to an area. Make sure animals with wounds are dressed and cleaned.

Muscidae

- Large fly group
- Includes number of species of economic/public health importance
- House fly, face fly, stable fly, horn fly, latrine fly



Forensic Entomology:
Flies

Sarcophagidae - flesh flies

- Adults lay larvae on decaying flesh
- Some of the first insect to reach a corpse

Calliphoridae – blowflies

- Different species have different habits – light vs. dark, urban vs. rural
- All have larvae that feed on corpses
- Also one of the first to arrive

Diseases caused by flies

- Typhoid fever
- Polio
- Cholera
- Bacillary dysentery
- Tricoma virus
- Leprosy
- Tuberculosis
- Enteric infections

Poliomyelitis

Poliovuirus

Polio is a highly contagious viral disease that can occur at any age. But children are more likely to contract the virus

90% haue no symptoms

10% haue flu-like symptoms

0.5% haue paralysis

Vaccination is the only prevention

Infection and destruction of anterior horn cells of spinal cord

Virus is transmitted in drinking water contaminated with feces

Virus replicates in the intestine

Spinal Cord

Nerue

Muscle

Some uirus pass from intestine into feces and contaminate water

Virus can go into the bloodstream (uiremia) and can extend to the spinal cord

Nerue cell damage can cause muscle paralysis in legs, muscles of abdomen, thorax or brainstem. Euen death

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Cholera

Classed by the World Health Organization as a key indicator of lack of social development

Life cycle

3 Disruption of water and sanitation systems, displacement of populations to overcrowded camps increases risk

4 Passes into human digestive system through drinking or contaminated food

Vibrio cholerae bacteria

- Up to 5 million cholera cases annually worldwide
- 100,000 to 120,000 deaths a year

2 Organic pollutants such as human and animal waste can provide the nutrients to trigger epidemic of the bacteria

1 V.cholerae naturally occurs in aquatic sources such as wetlands, estuaries, and stagnant water, often associated with algal blooms

Infection

- Incubation period 2 hours to 5 days
- About 75 percent of infected people do not develop symptoms
- **20 percent of those showing symptoms develop acute watery diarrhoea and dehydration**
- Can kill within hours if untreated, or successfully treated with rehydration salts, intravenous fluids

5 Exits body through faeces

Faeces can be contagious for up to 14 days

Source: WHO

CHOLERA

Acute, diarrheal illness caused by infection of the intestine with the bacterium Vibrio cholerae

Profuse watery diarrhea "rice water stools"

Vomiting

Dehydration

Circulatory collapse

Shock

Incubation period:
2 hours to 5 days

Annual Infection
3 -5 million

Annual deaths:
100,000

Make water safe

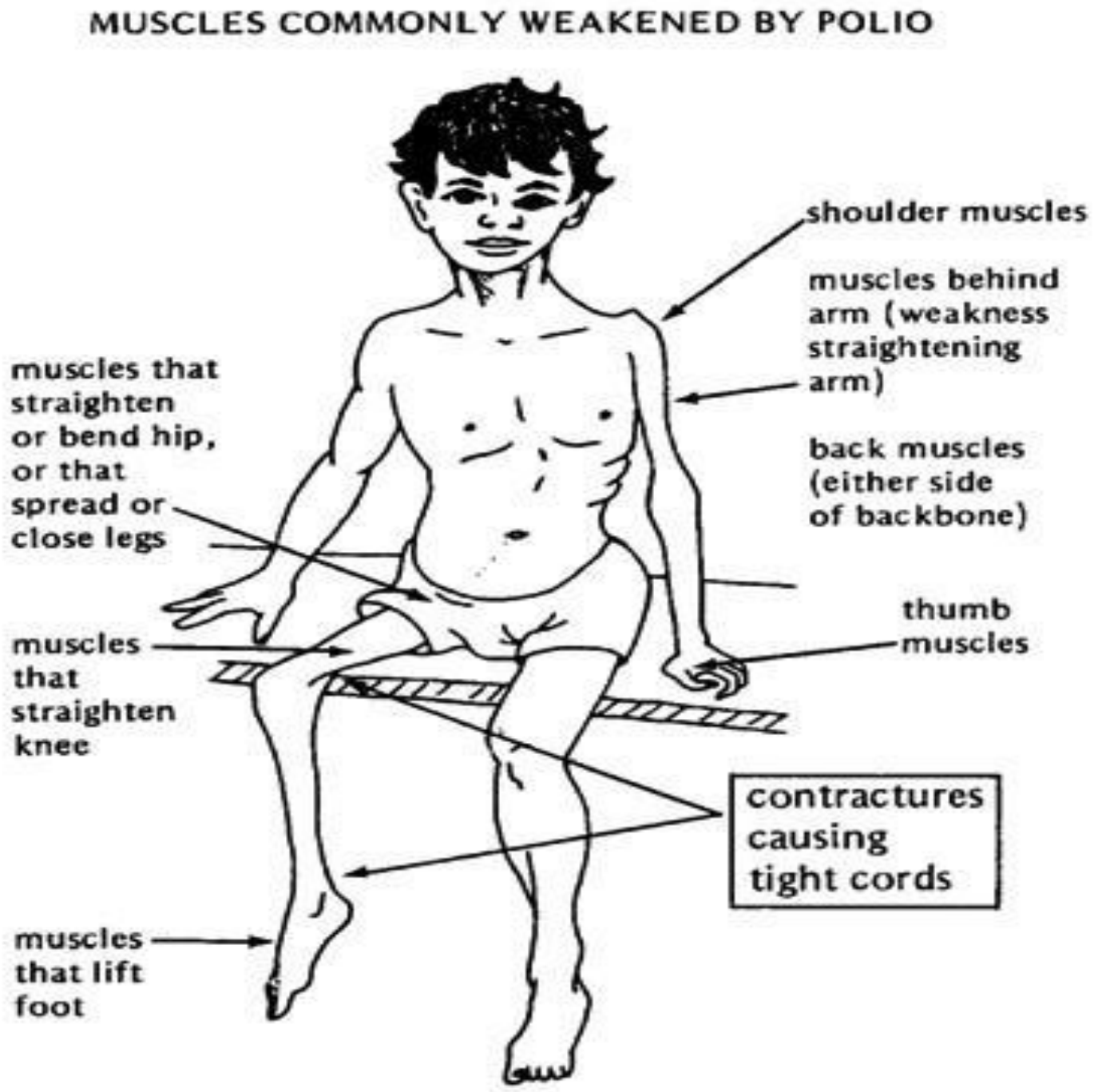
Prepare safe food

Infected by ingesting contaminated water or food

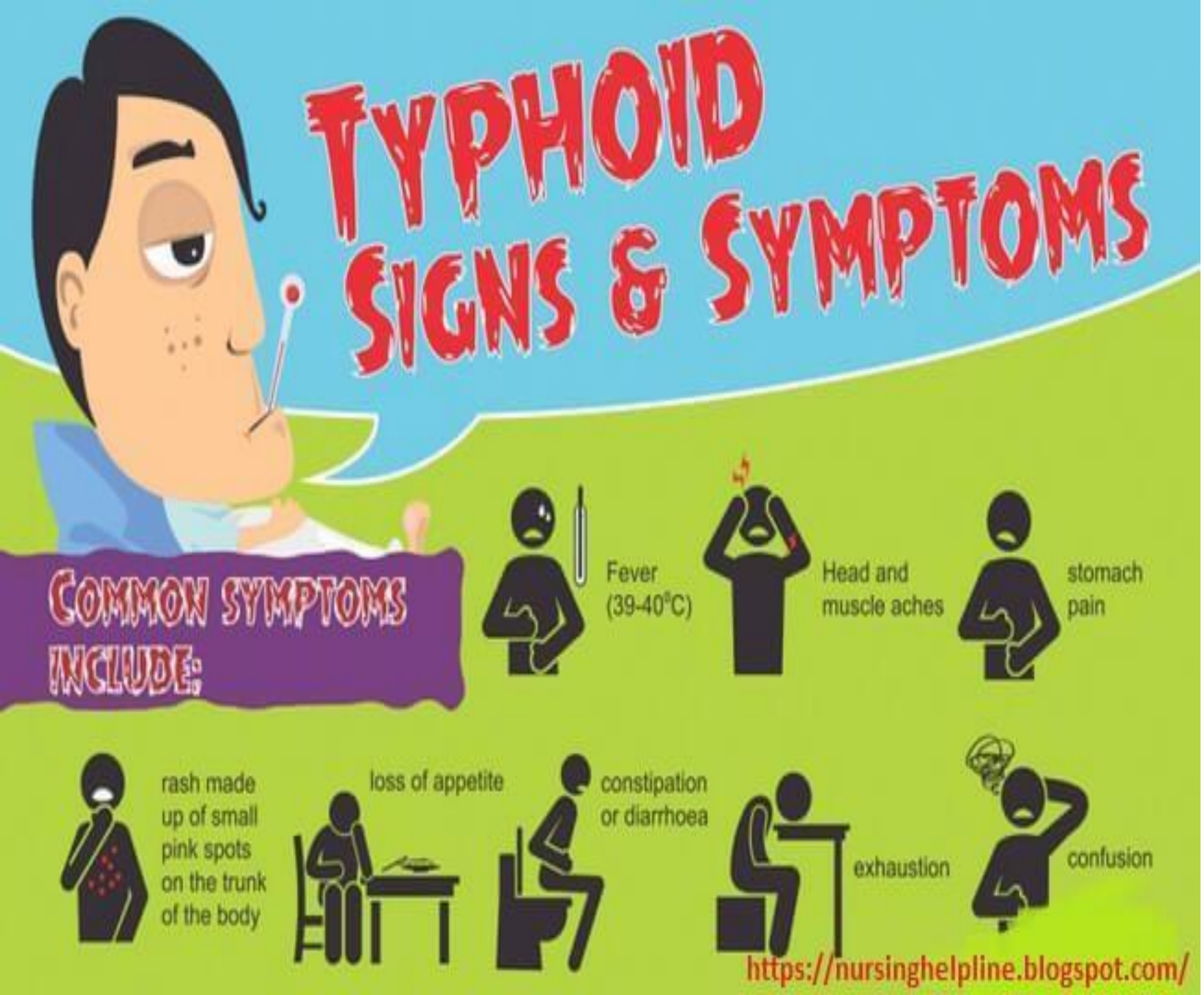
Wash your hands

Keep toilets clean

Bacteria exits body through feces
Feces can be contagious for upto 14 days

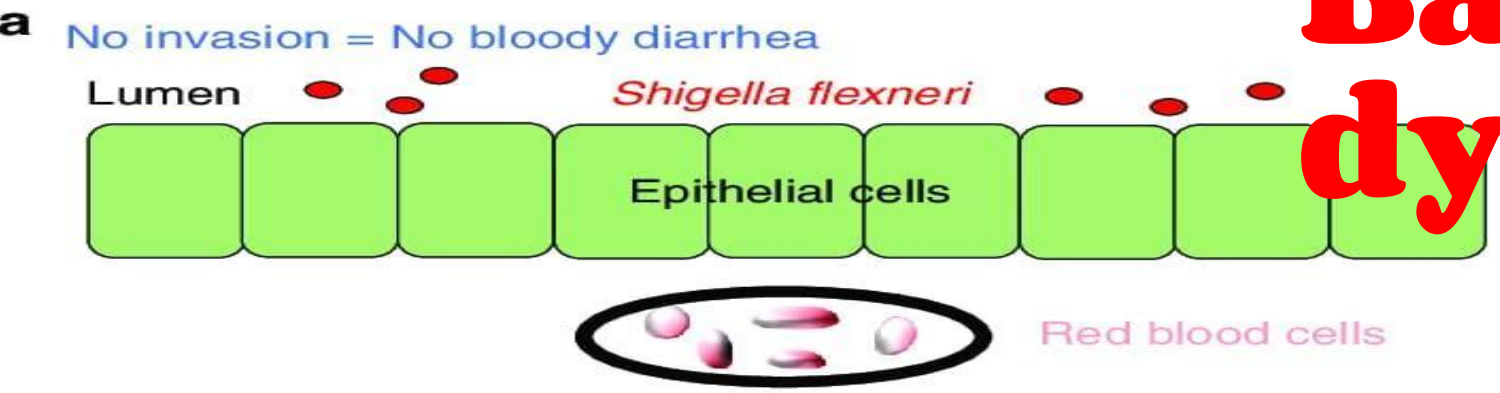


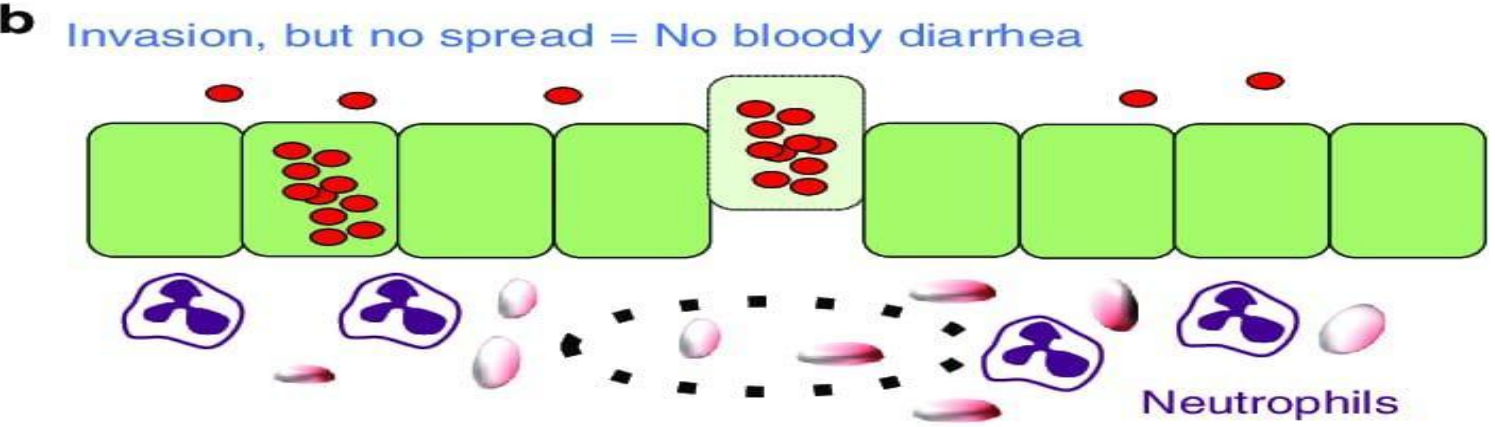
Polio is caused by the poliovirus. The polio virus usually enters the environment in the feces of someone who is infected. In areas with poor sanitation, the virus easily spreads from feces into the water supply, or, by touch, into food.

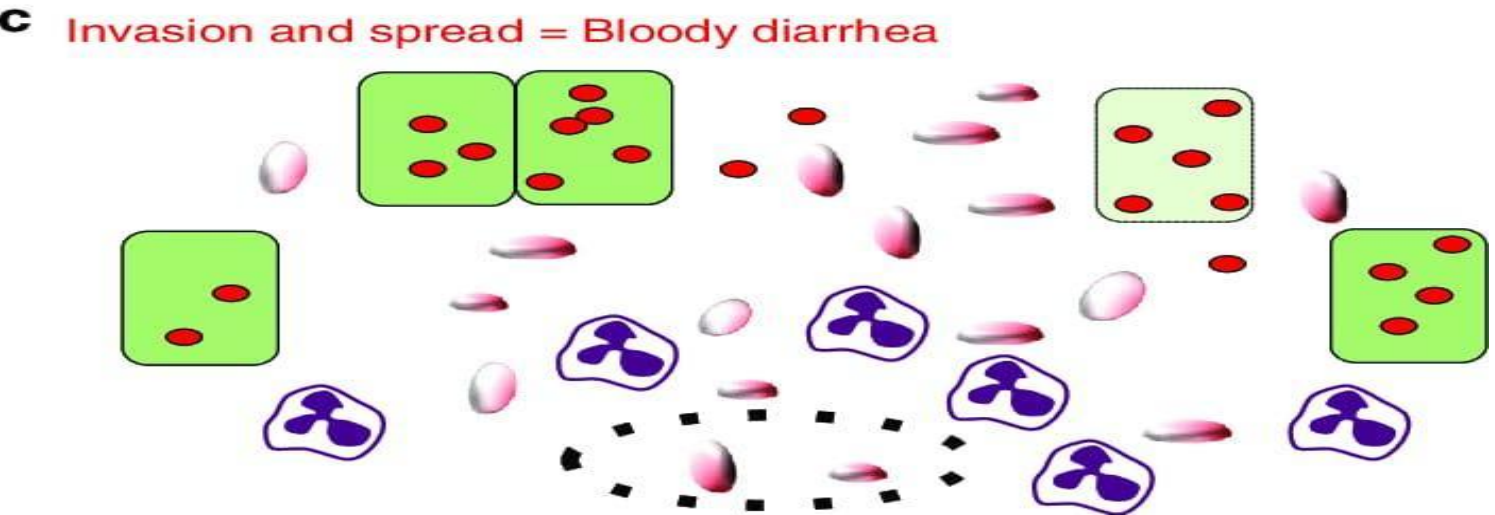


Typhoid is caused by the bacteria S. typhi and spread through food, drinks, and drinking water that are contaminate

Bacillary dysentery





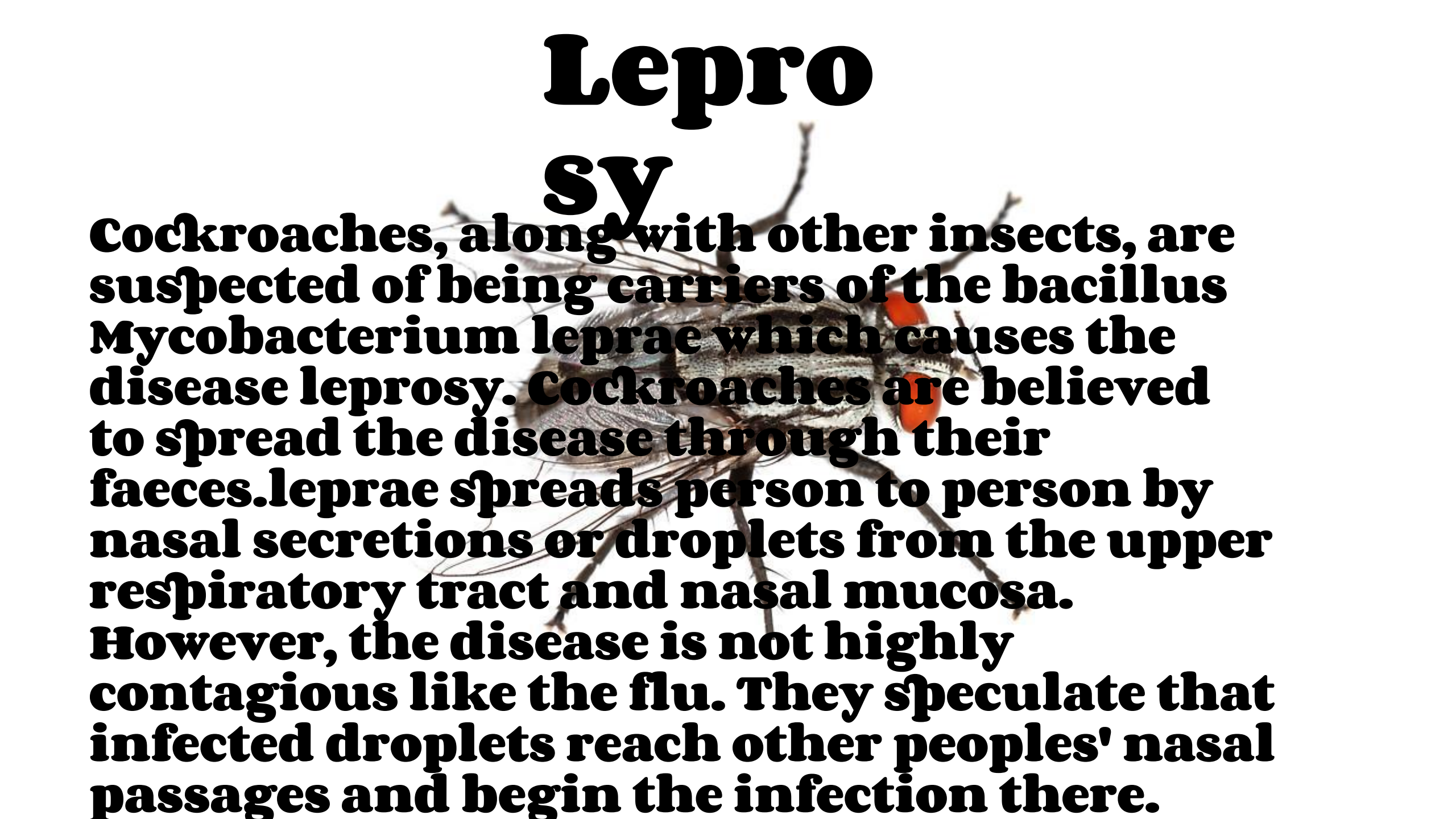


Bacillary dysentery is a type of dysentery, and is a severe form of shigellosis. Bacillary dysentery is associated with species of bacteria from the family Enterobacteriaceae. The term is usually restricted to Shigella infections. Shigellosis is caused

Enteric fever

Enteric Diseases and Food-Borne Diseases. Enteric diseases are caused by micro-organisms such as viruses, bacteria and parasites that cause intestinal illness. These diseases most frequently result from consuming contaminated food or water and some can spread from person to person

Leprosy



Cockroaches, along with other insects, are suspected of being carriers of the bacillus Mycobacterium leprae which causes the disease leprosy. Cockroaches are believed to spread the disease through their faeces.leprae spreads person to person by nasal secretions or droplets from the upper respiratory tract and nasal mucosa. However, the disease is not highly contagious like the flu. They speculate that infected droplets reach other peoples' nasal passages and begin the infection there.

References

https://www.science.gov/topicpages/c/calliphoridae+sarcophagidae+muscidae

https://www.researchgate.net/publication/265612586_Flies_as_Predators_and_Parasitoids_of_Terrestrial_Gastropods_with_Emphasis_on_Phoridae_Calliphoridae_Sarcophagidae_Muscidae_and_Fanniidae_Diptera_Brachycera_Cyclorrhapha


Thank You!